Summary

From our evaluations that largely used model-based criteria, we conclude that much of the East Mojave National Scenic Area (EMNSA) contains significant indications of epigenetic mineralization of various types. Economically significant concentrations of many metals may possibly remain to be discovered in many parts of the EMNSA (see also Wetzel and others, 1992). We have discussed specific types of metallic deposits that are known to be present in the EMNSA. Some mountain ranges that have widespread occurrences are the Providence Mountains, Clark Mountain Range, Ivanpah Mountains, and New York Mountains; the area of Hackberry Mountain is included in a tract that is judged to be favorable for the discovery of epithermal, volcanic-hosted gold deposits (pl. 2). These ranges make up a broad, roughly north-south-trending region in the central part of the EMNSA. Much less endowed with known occurrences of all of the various types of deposits considered above are the Granite Mountains, the central parts of the Piute Range, the Fenner Valley area, the general area of Cima Dome, the Cima volcanic field, and areas west to Soda Lake. We have attempted to make some judgments concerning the gravel-covered areas in the EMNSA (pl. 3), including the areal extent of bedrock apparently covered only by thin veneers of gravel. But few data are available to us for the overwhelming bulk of the covered areas. The presence of any mineralization, the type of mineralization, and the extent and intensity of mineralization in the covered areas is essentially unknown. The likelihood is high, however, that those areas in the EMNSA covered only by a thin cap of gravels could host mineralization similar to that known in the adjoining mountain ranges. Most buried epigenetic-mineral deposits do not respond to standard geophysical methods, particularly at the coarse spacing of the data-collection points available for our evaluation.

Restricting judgments concerning the presence of undiscovered metal resources in the EMNSA only to currently known types of deposits and to regionally representative tonnages for such deposits would undoubtedly yield small estimates for volumes of many metals that might be exploited.

Metals from most newly discovered, base- and ferrous-metal deposits of the types presently known in the EMNSA probably would be insignificant from the standpoint of national needs. For example, copper from a newly discovered skarn deposit in the EMNSA would have roughly a 25 percent chance of being in excess of approximately 10,000 tonnes contained Cu, if the grade-and-tonnage distribution curves of Jones and Menzie (1986b) for copper skarns are applicable to copper skarn in the EMNSA. Most copper in the United States is produced in the Southwest from much larger open-pit operations than those associated with the typical copper skarn; the former operations exploit large-tonnage porphyry-type systems. Historically, the EMNSA has been the site of minor production of many metals from a large number of sites. Since 1985, however, a small number of sites in the EMNSA whose gold production and reserves are much greater than that of the preceding discoveries have been developed (see U.S. Bureau of Mines, 1990a).

Nonetheless, widespread distribution of numerous types of deposits (including copper skarn, lead-zinc skarn, tin-tungsten skarn, polymetallic vein, gold-silver quartz-pyrite vein, low-fluorine porphyry molybdenum, gold breccia pipe, and volcanic-hosted gold) that are petrogenetically associated with igneous rock in many parts of the EMNSA is indicative of a metallogenic environment that may be the site of future discoveries of mineral-deposit types that are not now recognized by the exploration community. The science, art, and, yes, even luck of exploration procedures continually evolve, and this evolution is one of the most important aspects of currently employed methods of exploration (Bailly, 1981; Hutchinson and Grauch, 1991).